

# **Hazard Elimination Project Evaluation**

Project Log # 200502116

Hazard Elimination Project W-3609

**Evaluation of Traffic Signal Installation and Turn Lanes on NC 710 from  
SR 1339 (Deep Branch Rd) to NC 711, Robeson County**

Documents Prepared By:

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5/23/06  
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Date

# ***Hazard Elimination Project Evaluation Documentation***

## **Subject Location**

Evaluation of Hazard Elimination Project W-3609 – Signal Installation and Turn Lanes on NC 710 from SR 1339 (Deep Branch Rd) to NC 711 in Robeson County

## **Introduction**

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naïve before and after analysis has been completed to measure the effectiveness of this hazard elimination project. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

## **Project Information and Background from the Project File Folder**

The safety countermeasure chosen for the subject location was to install a traffic signal and turn lanes at the intersection of NC 710 and SR 1339 (Deep Branch). The section of roadway between SR 1339 and NC 711 was also widened to a four lane cross section to provide for a Westbound right turn lane approaching SR 1339 and an Eastbound left turn lane approaching NC 711. The project was let in November of 1997 and closed out in May of 1998 at an estimated cost of \$220,000.

The initial crash analysis for this location was completed from August 1, 1990 through July 31, 1993 with a total of 20 reported crashes. The initial crash analysis included all crashes within 150 feet of the intersection of NC 710 and SR 1339 (Deep Branch). According to the initial crash analysis, there were seven Angle crashes, seven Ran-Off-Road crashes, four Rear-End crashes, and two random type crashes that resulted in five class B injuries and twelve class C injuries.

## **Naïve Before and After Analysis**

After reviewing the hazard elimination project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from September 1, 1997 through August 31, 1998. The before period consisted of reported crashes from December 1, 1990 through August 31, 1997 (6 Years, 9 Months) and the after period consisted of reported crashes from September 1, 1998 through May 31, 2005 (6 Years, 9 Months). The ending date for this analysis was determined by the available after period crash data.

The treatment data consisted of all crashes on the approximately 0.19 mile strip of NC 710 from SR 1339 (Deep Branch) to NC 711 with a 150 foot y-line. Please see the attached *Location Map* for further detail.

The following table depicts the Naïve Before and After Analysis for the Total Crashes and Target Crashes at the treatment location. Please note that target crashes for the applied countermeasure were crashes in the following categories:

- Category 1: Rear End crashes on Eastbound approach to NC 710 at NC 711 intersection *OR*
- Category 2: Rear End crashes on section of NC 710 between NC 711 and SR 1339 *OR*
- Category 3: Rear End crashes on NC 710 approaches to SR 1339 *OR*
- Category 4: Frontal Impact crashes at the intersection of NC 710 and SR 1339.

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	65	39	-40.0%
Total Severity Index	8.23	8.49	3.2%
Target Crashes	53	26	-50.9%
Target Severity Index	7.6	10.82	42.4%
Category 1 Crashes	5	0	-100.0%
Category 1 Severity Index	6.92	0	-100.0%
Category 2 Crashes	1	0	-100.0%
Category 2 Severity Index	8.4	0	-100.0%
Category 3 Crashes	5	1	-80.0%
Category 3 Severity Index	5.44	1	-81.6%
Category 4 Crashes	42	25	-40.5%
Category 4 Severity Index	7.91	11.21	41.7%
Volume	4,900	5,400	10.2%

Target Crash Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Fatal Injury Crashes	1	0	-100.0%
Non-Fatal Injury Crashes	37	16	-56.8%
Total Injury Crashes	38	16	-57.9%
Night Crashes	14	7	-50.0%
Wet Crashes	11	4	-63.6%

The naïve before and after analysis at the treatment location resulted in a 40 percent decrease in Total Crashes, a 51 percent decrease in Target Crashes, and a 10 percent increase in Average Daily Traffic (ADT). Further investigation shows there was a 3 percent increase in Severity Index for Total Crashes and a 42 percent increase in the Severity Index for Target Crashes. The before period ADT year was 1994 and the after period ADT year was 2002.

## **Results and Discussion**

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 40 percent decrease in Total Crashes and a 51 percent decrease in Target Crashes. Further investigation shows that the Severity Index of Total Crashes has changed very little while the Severity Index of Target Crashes has increased 42 percent using naïve methodologies. The Severity Index of Target Crashes has increased in the after period even though the raw number of injury crashes has decreased significantly (58 percent). There were two class A injuries in the after period, both of which were frontal impact crashes at the intersection of NC 710 and SR 1339.

The collision diagram shows the crashes at the intersection of NC 710 and SR 1339 have decreased significantly. Of the remaining crashes, Frontal Impact Crashes continue to be the predominant pattern at the intersection. There were 10 Angle Crashes in the after period that involved a vehicle running a red light and 9 Left Turn – Same Roadway Crashes. Eight of the 9 Left Turn – Same Roadway Crashes occurred on SR 1339 approaches. According to the crash reports, there were only 2 crashes that occurred when the signal was in Late Night Flash mode.

The intersection of NC 710 and NC 711 experienced a 25 Percent decrease in Total Crashes and a 50 Percent decrease in Injury Crashes. The pattern of Rear End Crashes on the Eastbound NC 710 approach has been alleviated due to the turn lane now available for left turning vehicles.

As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

*Treatment Site Photos (Taken on December 6, 2005)*



Looking Southeast on SR 1339 (Deep Branch Rd) towards NC 710



Looking Northwest on SR 1339 (Deep Branch Rd) towards NC 710

*Treatment Site Photos (Taken on December 6, 2005)*



Looking Northeast on NC 710 towards SR 1339 (Deep Branch Rd)



Looking Southwest on NC 710 towards SR 1339 (Deep Branch Rd)



*Treatment Site Photos (Taken on December 6, 2005)*

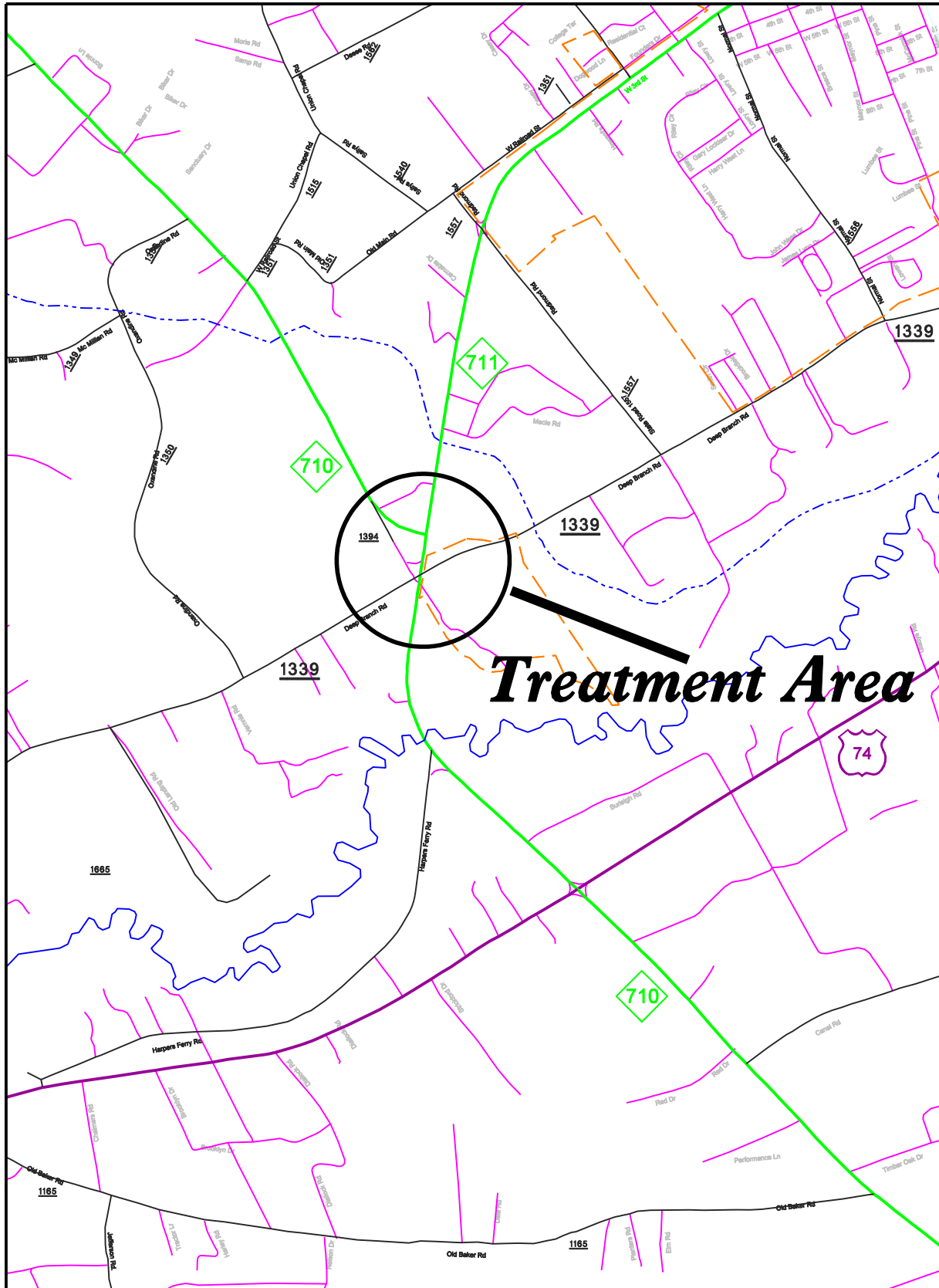


Looking Southwest on NC 711 towards NC 710



Looking Southeast on NC 710 towards NC 710 / NC 711

# ***Location Map, Robeson County Evaluation of W-3609***



***Treatment Location: NC 711 at NC 710 and SR 1339***



W-3609  
Before Period  
12/01/1990 - 08/31/1997  
(6 Years, 9 Months)

NC 710

55 MPH

SR 1339 (DEEP BRANCH ROAD)

55 MPH

NC 710

SR 1339 (DEEP BRANCH ROAD)

55 MPH

NC 710

55 MPH

NC 711

**LEGEND**

W-3609  
After Period  
09/01/1998 - 05/31/2005  
(6 Years, 9 Months)

